

BOTANY.—*The Carpet grasses.* AGNES CHASE,¹ Bureau of Plant Industry.

Carpet grass, *Axonopus compressus* (Swartz) Beauv., has always been a puzzling complex. The type from Jamaica, collected by Swartz and described by him as *Milium compressum* has not been located but the original description (Prodr. 24. 1788) and the later amplified description (Fl. Ind. Occ. 1: 183. 1797) leave no doubt that the name applies to the broad-leaved form with glume and sterile lemma pointed beyond the fruit, common in the West Indies and Brazil. In the herbarium of the Königliches Botanisches Museum at Munich is a specimen labeled, but not [?] in Swartz's script, "*Milium compressum* Sw., Jamaica, O. Swartz." This, which is probably part of the type collection, is the typical West Indian form with broad blades and spikelets with glume and sterile lemma extending well beyond the fruit.

Of the 17 names referred as synonyms to *Axonopus compressus* in Hitchcock's Manual of Grasses of the United States (page 804) the type specimen has been examined of all but two, *Milium compressum* Swartz and *Paspalum laticulmum* Spreng., the first from Jamaica. A specimen from Jamaica collected by Swartz was examined in the herbarium at Munich. Sprengel's description of *P. laticulmum* points to *Axonopus compressus*, and he cites *Milium compressum* Swartz as a synonym. All the types are the typical form of the American tropics with broad blades often slightly plicate, broad-leaved coarse stolons, and spikelets 2.2 to 3 mm long, the glume and sterile lemma extending beyond the fruit. In the United States this form is known only from Florida and Louisiana. The narrow-leaved form with glume and sterile lemma not or scarcely pointed beyond the fruit, common in the Southern States, rare in Western Cuba and southern Mexico, and infrequent in Central America, has not been described as a distinct species.

The difference from true *Axonopus compressus* is slight and there are intergrades, but on the whole specimens may be segregated with relatively few intermediates. The late Professor C. V. Piper was at one time positive that the narrow-leaved form was distinct, at first declaring it was not stoloniferous. But the writer showed him short arching stolons on some of the specimens he collected. As a whole this form is less commonly stoloniferous than is true *A. compressus*, but sometimes develops extensive stolons. Field notes by the writer on

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narrow-leaved plants in the vicinity of Lake Charles, Louisiana, state that sterile plants form a carpet in woods of pine, oak, Liquidamber, and hickory, the flowering culms being relatively few. The specimens from this colony are tufted, with short rhizomes but no stolons.

The two forms have been recognized as distinct by various authors, the broad-leaved one generally under the name *Paspalum platycaulon* Poir. or *Anastrophus platycaulis* (Poir.) Nash, the narrow-leaved under the name *Paspalum compressum* (Swartz) Rasp. But Swartz's species is undoubtedly the same broad-leaved form as Poiré's type from Puerto Rico.

Carpet grass is esteemed as a good pasture grass from the southern Coastal Plain to Texas. In a paper on Carpet Grass by C. V. Piper and Lyman Carrier (Farmers' Bulletin 1130, U. S. Dept. Agr. pp. 1-12. 1920) it is said to be introduced into this country. The map (page 3), showing distribution from North Carolina to Texas, indicates that both forms of carpet grass are included, since the broad-leaved is known only from Florida and Louisiana. The illustration (page 5) represents the narrow-leaved form. This form is undoubtedly native, the center of distribution apparently being the Gulf Coast from Florida to Louisiana. It, like the wide-leaved form, is introduced in the tropical and subtropical regions of Asia, Africa, and Australia. The broad-leaved form is the only one known from the West Indies, except from western Cuba. It may possibly have been introduced into the Gulf States but more probably it is native though less widespread than the narrow-leaved form in the United States. It is the common form of carpet grass from Mexico to Paraguay.

No distinction in forage value seems to be made between the two forms in this country, but Dr. J. N. Whittet, agrostologist of the Department of Agriculture, Sydney, New South Wales, on a recent visit to the Office of Grass Investigations, stated that in Australia the narrow-leaved form is regarded as a pest, invading pastures of *Paspalum dilatatum* Poir. and taking possession of them, since the animals graze the paspalum and leave the carpet grass to go to seed. It is not, as might be supposed, a case of mistaken identity, because specimens of both forms from Australia are in the National Herbarium and Dr. Whittet readily recognized them. Australia produces seed of carpet grass for export, shipping it even to the United States, but, Dr. Whittet says, this is the only country that does not object to the intermixture of seed of the narrow-leaved form. The Economic Index kept by the Office of Grass Investigations contains numerous notes on carpet grass from various tropical and subtropical regions,

most of them favorable, such as "valuable, especially on poor lands," and "one of the best pasture grasses for the tropics." But in the *Agricultural Gazette*, New South Wales (47: 555. 1936), is a note on "narrow-leaved carpet grass" to the effect that it is spreading rapidly, grows well in poor soil, but tends "to invade *Paspalum dilatatum* pastures on better soil," and in the *Queensland Agricultural Journal* (43: 503. 1935) a note states that it "invades paspalum pasture and if it gets a good hold may ruin the pasture." It seems probable that the narrow-leaved carpet grass may be only less palatable than *Paspalum dilatatum*, that in regions where the paspalum is wanting or scarce, animals readily graze the narrow-leaved as well as the broad-leaved carpet grass.

Mr. Mason A. Hein, Agronomist of the Division of Forage Crops and Diseases, kindly sent inquiries as to palatability of the two forms of carpet grass to field men in the Division, and their replies confirm this opinion.

Since *Axonopus compressus* in this country is only found in Florida and southern Louisiana and is the common form in the tropics, whereas the narrow-leaved form ranges from North Carolina to Arkansas, it would appear that the latter is more winter hardy than is *A. compressus*. All factors considered, it seems better to recognize the narrow-leaved form as a distinct species.

Axonopus affinis sp. nov.

Ab *Axonopo compresso* differt: culmis et stolonibus gracilioribus, laminis angustioribus; spiculis brevioribus, 2 mm longis, obtusis vel subacutis.

Plants more tufted than in *A. compressus*, sometimes forming dense mats with short rhizomes, the flowering culms in such colonies relatively few; stolons slender, apparently mostly developing after the flowering of the primary culms, at first arching, sometimes creeping as much as 30 cm, the internodes short, and the blades not, as in *A. compressus*, conspicuously shorter than the culm blades; culms erect to geniculate-ascending, on the average more slender than in *A. compressus*, commonly 25 to 35 cm tall, rarely to 75 cm, the nodes glabrous (often bearded in *A. compressus*); sheaths compressed, on the average narrower than in *A. compressus*; blades flat or folded in drying, 2 to 4, rarely to 5 or 6 mm wide, mostly 5 to 15 cm long, rarely to 28 cm long, the apex sometimes splitting; peduncles very slender, 1 to 3 from the uppermost sheath, finally elongate; racemes 2 to 4, ascending, 2 to 10 (mostly 3 to 7) cm long; spikelets oblong-elliptic, rather more plump than in *A. compressus*, sometimes purple-tinged, 2 mm long, 0.8-0.9 mm wide, blunt or abruptly subacute, the glume and sterile lemma equal, covering the fruit or slightly pointed beyond it, 4-nerved, the mid-nerves suppressed, very sparsely silky-pilose at base and summit and some times in a line along the nerves; fruit pale, 1.7 to 1.8 mm long, blunt.

Type in the U. S. National Herbarium, no. 928710, collected "in low moist ground, Waynesboro, Mississippi, October 2, 1896, by Thos. H. Kearney, Jr. Much grazed by cattle."

Intermediate specimens are found with blades to 7 mm wide and spikelets 2.2 to 2.3 mm long, slightly pointed (*Combs* 414 and *Curtiss* 5879 in part, both from Quincy, Florida). Others with the habit of *A. compressus*, with pubescent nodes and short broad stolon blades, have spikelets 2 to 2.2 mm long but with the glume and sterile lemma pointed beyond the exceptionally short fruit (*Combs* 1324, Bradenton, and *Curtiss* 6638, Mabel, both Florida).

Low commonly moist, often sandy meadows, open woods, old fields, pastures and waste places, sometimes forming a turf, North Carolina to Florida and west to Arkansas and Texas. "Forms bulk of native pastures in open woods of Red River valley, Louisiana" C. R. Ball (no. 115). Also in western Cuba, southern Mexico.

The following specimens are in the U. S. National Herbarium:

NORTH CAROLINA: Wilmington, *Hitchcock* in 1905.

GEORGIA: Union, *Harper* 1086. Savannah, *Kearney* 197.

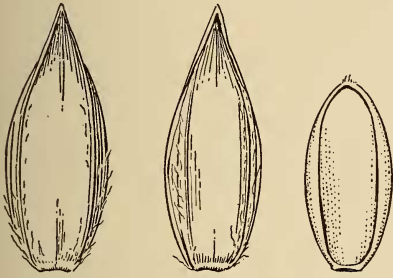


Fig. 1.—*Axonopus compressus*. Two views of spikelet, and fruit, $\times 10$. (Type of *Paspalum tristachyon* Lam.)

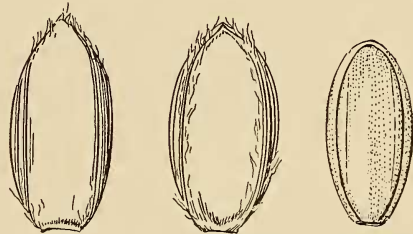


Fig. 2.—*Axonopus affinis*. Two views of spikelet, and fruit, $\times 10$. (Type.)

FLORIDA: Avondale, *Combs* 494; Pensacola, *Combs* 517; Apalachicola, *Kearney* 111; Tallahassee, *Combs* 362, 363; *Kearney* 87; Madison, *Combs* 265, 244; Jefferson County, *Hitchcock* 2462, 2463; Monticello, *Combs* 313; De Funiak Springs, *Combs* 450; Baldwin, *Combs* 51; Jacksonville, *Combs* 1; *Curtiss* 3565, 4023, 5077, 5589, *Hitchcock* in 1900 and 1903; Duval County, *Fredholm* 5255; Quincy, *Curtiss* 5879; Chipley, *Combs* 544; Suwannee County, *Hitchcock* 2518; Lake City, *Combs* 78; *Combs & Rolfs* 109, 135, 155, 176, 181; *Hitchcock* 2461; *Rolfs* 981; Gainesville, *Combs* 733; Waldo, *Combs* 694; Ellzey, *Combs* 830; Titusville, *Chase* 3969; Sanford, *Hitchcock* 783; Eustis, *Nash* 1219; Hillsborough County, *Fredholm* 6379; Fort Meade, *McFarlin* 3724; Winter Haven, *McFarlin* 5760; Lakeland, *Hitchcock* 831; Bartow, *Combs* 1243; Bradenton, *Combs* 1332; Myers, *Hitchcock* 502, 503; Palmetto, *Tracy* 7047; Imokalee, *Swallen* 5313; Alva, *Hitchcock* in 1900.

ALABAMA: Tuskegee, *Carver* 37; Selma, *Kearney* 6; Spring Hill, *Bush* 201, 203; Tuscaloosa, *Mohr* 17.

MISSISSIPPI: Nicholson, *Kearney* 356; Biloxi, *Chase* 4333; *Ricker* 862; *Swallen* 1937; *Tracy* 3862; Ocean Springs, *Seymour* 18; *Tracy* 72, 6506.

ARKANSAS: Texarkana, *Eggert* 138; *Letterman* in 1894; Arkansas County, *Adair* 3368.

LOUISIANA: Royville, *Ball* 11. Coushatta, *Ball* 115; Shreveport, *Hitchcock* in 1903; Calhoun, *Ball* 55; Oberlin, *Ball* 224; Lake Charles, *Chase* 6100, 6109; *Hitchcock* 1121; Baton Rouge, *Billings* 18; Covington,

Arsène 11257, 11278, 12223; Pointe-a-la-Hache, *Langlois* 24, 149; Houma, *Wurzlou* in 1913, Avery Island, *Hitchcock* 19835.

TEXAS: Houston, *Bebb* 1247, 1264; *Hall* 813; *Ravenel* in 1869; Waller, *Hitchcock* 1218; Columbia, *Bush* 285; Beaumont, *Plank* 23, 28; Gonzales County, *Bogusch* 1302; Bay City, *Silveus* 901; Tom Green Co., Tweedy in 1880.

MEXICO: Jalapa, *Hitchcock* 6588; Minatitlan, *J. G. Smith* 574.

GUATEMALA: Cobán, *Türkheim* 1253.

EL SALVADOR: La Unión, *Hitchcock* 8783½.

CUBA: Habana, *Léon* 298; Herradura, *Ekman* 10786; *Hitchcock* 486; Without locality, *Wright* 3850.

HAWAII: Kona (Oahu), *Hitchcock* 19699.

ASIA: Malay Peninsula, Singapore Botanic Garden, *Furtado* 25877.

AUSTRALIA: "North Coast districts, naturalized and common in New South Wales," *Whittell* B in 1930.

This species forms much the greater part of the "carpet grass" of the Southeastern States where it is esteemed as a good pasture grass, and where it may be established "in open forests, or cut-over land, without going to the expense of clearing. . . . Under close grazing most of the native bunch grasses will be killed by the end of the first season and carpet grass will occupy the land." (Piper & Carrier, U. S. Dept. Agr. Farmers' Bull. 1130: 8. 1920).

Paspalum conjugatum Berg., a common but worthless grass of the tropics and subtropics, has sometimes been confused with *Axonopus compressus*, which it resembles. Reports of forage value of *Paspalum conjugatum* (under several local names including "sour grass" in the British West Indies, "Mission grass" in Queensland) are almost certainly based on mistaking *A. compressus* for *P. conjugatum*. The two have much the same habit and often grow together. In Matto Grosso, Brazil, the writer examined native pasture of *A. compressus* and *P. conjugatum* where cattle were grazing. The *Axonopus* was closely grazed while the *Paspalum* growing with it was left untouched.